tributaries and above Dundee Dam. The samples will be collected during the five Routine Events with most stations sampled four times during the tidal cycle and at the depths indicated above. The station above Dundee Dam and the tributaries will each be sampled one time during each event.

- **Low Flow/Spring Tide Event -** Water samples will be collected during low flow (< 400 cfs at Dundee Dam) and spring tide conditions at eight locations in the LPR and its tributaries for laboratory analysis. The tributary locations, the station above Dundee Dam and RM 1.4 will be the same as those sampled in the Routine Events. The most upstream location will be located at RM 10.2 (flow 250 - 400 cfs) or RM 13.5 (flow < 250 cfs). Other station locations in the LPR will be determined based on the flow and tide stage in the river (see Exhibit 1). Samples will be collected from the thalweg and at two depths (3 ft below surface and 3 ft from the bottom) for the stations in the LPR (RM 0 - 17.4), with each station sampled four times during the tidal cycle and at the depths indicated above. For the tributaries and above Dundee Dam, each station will be sampled once at mid-depth. A total of forty-four (44) samples will be collected during the Low Flow/Spring Tide Event. It is anticipated the Low Flow/Spring Tide Event will occur in the late summer to early autumn.

- **High Flow Events -** Water samples will be collected during storm-induced high flow (i.e., not sustained high flow) conditions (>3,000 cfs at Dundee Dam) at 17 locations in the LPRSA (including the LPRSA tributaries), above Dundee Dam, Newark Bay, Hackensack River, Arthur Kill, and Kill van Kull for laboratory analysis. Stations will be co-located with the fixed (i.e., for flows > 1,000 cfs) Routine Event stations. Fourteen (14) stations will be sampled four times each throughout the predicted storm hydrograph; the station above Dundee Dam will be sampled six times throughout the predicted storm hydrograph. Samples collected from the Arthur Kill and Kill van Kull will be sampled at high and low slack water. Samples will be collected from the thalweg and at two depths (3 ft below surface and 3 ft from the bottom) for the stations in the LPR (RM 0 – 17.4) and the NBSA, and at mid-depth for the tributaries and above Dundee Dam. A total of two hundred twenty-eight (228) samples will be collected during two separate High Flow Events. The High Flow events will be conducted based on the flow conditions, but are likely to occur during the spring and very early summer.

Target sampling coordinates for fixed locations are presented in Table 1 and illustrated for the overall survey area in Figure 1.

Table 1: CWCM Program Sampling Station Target Coordinates

Sampling Location	Station Name	Target Coordinates NAD83 NJ State Plane feet (ft)	
		Easting	Northing
Above Dundee Dam	T175	594536	747557
RM 13.5[a]	T135	597204	734288
RM 10.2[b]	T102	592153	719744
RM 6.7[c]	T067	586132	702831
RM 4.2[c]	T042	588234	692388
RM 1.4	T014	597906	691249
RM 0	T000	591298	683190
Tidal 1[d]	TBD	TBD	TBD
Tidal 2[d]	TBD	TBD	TBD
Second River	T2R1	587759	709726

Sampling Location	Station Name	Target Coordinates NAD83 NJ State Plane feet (ft)	
		Easting	Northing
Third River	T3R1	593685	726123
Saddle River	TSR1	605766	743410
Newark Bay North	TNBN	597246	677109
Newark Bay East	TNBE	595586	670959
Newark Bay Northeast	TNNE	599590	680260
Newark Bay Northwest	TNNW	595916	677291
Newark Bay South	TNBS	590441	663600
Arthur Kill	TARK	579874	660352
Kill Van Kull	TKVK	595168	659376
Hackensack River	THKN	605562	693977

Notes:
[a] Sampled when flow at Dundee Dam < 250 cfs
[b] Sampled when flow at Dundee Dam > 250 cfs
[c] Sampled when flow at Dundee Dam > 1,000 cfs
[d] Sampled when flow at Dundee Dam < 1,000 cfs
TBD = To be determined. See Exhibit 1.

Samples will be collected by peristaltic pump following Standard Operating Procedure (SOP) LPR-FI-04 and SOP LPR-FI-06 (SOPs are included in Appendix B of the QAPP). Samples for metals (SOP LPR-FI-06) will be sampled first at each station. Total recoverable and dissolved metals including methyl mercury will be sampled first using the peristaltic pump. Note that hexavalent chromium will only be collected as a filtered sample per the analytical method. Following the completion of metals sampling using the pump sampler, the remaining analytes will be collected. Bottles for constituents will be filled in decreasing order of constituent volatility. Bottles for Target Compound List (TCL) volatile organic compounds (VOCs) will be filled first, immediately upon retrieval of the sampler, followed by total organic carbon (TOC). The remaining bottles will be filled sequentially, per SOP LPR-FL-04.

River water that is collected during the sampling but is not needed to fill the required sample containers will be temporarily containerized, and will be returned to the river upon completion of sampling at each station, consistent with SOP LPR-G-04. A continuous water column profile of temperature, dissolved oxygen, pH, turbidity, salinity and conductivity will be measured at each station prior to sample collection and immediately following sample collection according to SOP LPR-FI-05. The second profile, collected at the conclusion of sampling at a station in the same manner as the profile collected prior to sampling, will document any changes in the water column. At stations greater than 6 feet deep and those where two depth intervals will be sampled, the data sonde will be lowered to 3 feet above the bottom and allowed to stabilize. The meter will be raised manually at a speed not to exceed 1 foot per second, depending on the manufacturer's specifications for the response time of the sensors, recording continuously. When the data sonde reaches the second sampling depth of 3 feet below surface, a second fixed reading will be taken to indicate the conditions at the sampling interval. At stations where only one depth is to be sampled, the meter will be allowed to stabilize at the sampling depth. As indicated in SOP LPR-FI-05, this profile will be measured prior to, and immediately following sampling in order to document any changes in the water column. These *in-situ* parameters will also be measured continuously during sampling collection at the target depth. The depth will be measured using a graduated line, depth gage and the vessel fathometer.